

WHAT IS CLAIMED IS:

1. A moving magnet type linear actuator, comprising:

a stator unit including a stator base and an armature unit having a magnetic core secured to the stator base and an armature winding wound around the magnetic core; and

a moving unit including a field permanent magnet arranged so as to face the magnetic core via a magnetic first gap and a magnet holder movably disposed on the stator base while holding the field permanent magnet,

wherein the magnet holder is made of nonmagnetic material,

wherein a magnetic back yoke is arranged at an anti-armature side of the field permanent magnet, and has a width approximately the same as a width of the field permanent magnet and a length exceeding approximately a stroke of the moving unit, longitudinal ends of the magnetic back yoke being secured to the stator unit,

wherein a magnetic second gap is formed between the magnetic back yoke and the field permanent magnet, and

wherein the magnetic second gap is set to be larger than the magnetic first gap to offset magnetic attraction forces applied to the movable unit.

2. The moving magnet type linear actuator as recited in claim 1, wherein, when the armature unit has an open slot, the magnetic first gap / the magnetic second gap is set to 0.45/0.55 to 0.35/0.65.

3. The moving magnet type linear actuator as recited in claim 1, wherein, when the armature unit has a semi-open slot, the magnetic first gap / the magnetic

second gap is set to 0.49/0.51 to 0.48/0.52.

4. The moving magnet type linear actuator as recited in claim 1, wherein a scale portion of a linear scale is secured to the magnet holder, and wherein a detecting portion of the linear scale is secured to the stator base so as to face the scale portion via a third gap.

5. The moving magnet type linear actuator as recited in claim 2 or 3, wherein two linear guide rails are extended in a longitudinal direction of the armature unit and arranged in parallel at both sides of the armature unit, wherein guide blocks are arranged on corresponding linear guide rails, and wherein the magnet holder is secured to the guide blocks.

6. The moving magnet type linear actuator as recited in claim 5, wherein a hole having a width corresponding to a width direction space between the guide blocks is formed in the magnet holder of nonmagnetic material, and the field magnet is secured in the hole.

7. The moving magnet type linear actuator as recited in claim 5, wherein a stopper mechanism is provided at each of four ends of the two parallel linear guide rails.

8. The moving magnet type linear actuator as recited in claim 1 or 4, a conduit for forced cooling liquid medium is embedded in the stator base.

9. The moving magnet type linear actuator as recited in claim 1, wherein the

magnetic back yoke is constituted by a laminated member of thin board electromagnetic plates.